



DEPARTMENT OF THE ARMY  
U.S. ARMY ARMAMENT RESEARCH, DEVELOPMENT AND ENGINEERING CENTER  
PICATINNY ARSENAL, NJ 07806-5000



AD-A276 438



REPLY TO  
ATTENTION OF

16 FEB 1994

①

SMCAR-AEP (1mm)

MEMORANDUM FOR Commander, Defense Technical Information Center,  
Building 5, Cameron Station, Alexandria, VA,  
22304-6145

SUBJECT: Release of Performance-Oriented Packaging Compliance  
Report

1. The attached report, (DOD POP HM TR/AYD 94-004), entitled:  
"Performance-Oriented Packaging (POP) testing of M879 Practice  
Cartridge for 81mm Mortar Packed in a Wood Wirebound Box", is  
hereby submitted for formal release. Notification of the  
release should be sent to the letterhead address.

2. Address any questions or comments regarding this report to  
Mr. Yuen H. Lam, telephone: 1-201-724-2228 (DSN 880-2228).

Encl

**DTIC**  
**ELECTE**  
**FEB 28 1994**  
**A**

*Eugene Farrell*  
EUGENE FARRELL  
Acting Chief, Pkg Div

This document has been approved  
for public release and sale; its  
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DTIC QUALITY INSPECTED 1

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# REPORT DOCUMENTATION PAGE

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11 TITLE (Include Security Classification) Performance-Oriented Packaging (POP) testing of M879 Practice Cartridge for 81mm Mortar Packed in a Wood Wirebound Box. (U)					
12. PERSONAL AUTHOR(S) Yuen H. Lam, Mechanical Engineer					
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FIELD	GROUP	SUB-GROUP	Performance-Oriented Packaging POP Cartridge, M879		
			Mortar, 81mm 12630601		
19. ABSTRACT (Continue on reverse if necessary and identify by block number)					
<p>This report contains test results conducted on the M879 Practice Cartridge for 81mm Mortar packaged in wood wirebound box per drawing 12630601. The tests were conducted in accordance with the requirements of 49 CFR part 107 subpart M (18.600 et. al.). The packaging is submitted for Performance-Oriented Packaging certification.</p>					
20. DISTRIBUTION / AVAILABILITY OF ABSTRACT <input checked="" type="checkbox"/> UNCLASSIFIED/UNLIMITED <input type="checkbox"/> SAME AS RPT. <input type="checkbox"/> DTIC USERS			21 ABSTRACT SECURITY CLASSIFICATION UNCLASSIFIED		
22a. NAME OF RESPONSIBLE INDIVIDUAL Yuen H. Lam			22b. TELEPHONE (Include Area Code) (201) 724-2228		22c. OFFICE SYMBOL SMCAR-AEP

I. **Report Number:** DOD POP HM TR/AYD 94-004

II. **Title:** Performance-Oriented Packaging (POP) testing of M879  
Practice Cartridge for 81mm Mortar Packed in a Wood  
Wirebound Box

Drawing Number: 12630601

Author: Yuen H. Lam

Performing Activity: U.S. Army Armament Research, Development  
and Engineering Center (ARDEC)

Address: Commander, U.S. Army ARDEC  
Attn: SMCAR-AEP  
Picatinny Arsenal, N.J. 07806-5000

Date: February 1993

Distribution Statement A.

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Justification	
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## 1. Data:

### Container:

Type: Box, Wirebound  
UN Code: 4C1  
Specification: MIL-B-46506  
Drawing Number: 12630601  
Material: Wood  
Maximum net mass: 17.5 kg (38.5 lbs)  
Dimensions: 63.8 cm X 33.0 cm X 13.5 cm  
(25 1/8 in X 13 in X 5 5/16 in)  
Gross Weight: 21.4 kg (47 lbs)

### Product:

Name: Cartridge, 81mm: Practice, M879 with Fuze, M751  
(Inner packaged in jungle wrap)  
Drawing Number: 12944145  
Cage Code: 19200  
United Nations Proper Shipping Name: Cartridges for  
Weapons, Inert Projectiles  
United Nations Identification Number: 0328  
United Nations Packaging Group: II  
Physical State: Solid  
Number of Cartridges per Container: 3  
National Stock Number (NSN): 1315-01-352-0392  
DOD Identification Code: C875

## 2. Reference Material:

- a. Federal Register, "49 CFR Part 107-179"
- b. United Nations, "Transport of Dangerous Goods"

## 3. Background:

This report details Performance-Oriented Packaging (POP) tests conducted on the 81mm M879 Practice Cartridge for 81mm mortar packed in a wood wirebound container in accordance with drawing 12630601. Each cartridge weighs approximately 9.0 lb. A package contains three cartridges. The POP tests were conducted using packages containing additional weights to insure container integrity. The weight of the packed out tested container was 58 lbs (26 kg). Tests were performed according to POP test regulations.

#### 4. Test:

The following POP tests were performed at ambient temperature:

##### a. Vibration Test (178.608)

###### Procedure:

Three wirebound boxes (No. 1, 2, and 3) were individually vibrated on a vibrating platform unrestrained for a one hour period each. The double-amplitude (peak-to-peak displacement) was one inch and the frequency was 300 cycles per minute. The frequency was sufficient to allow the package to become completely airborne and enable a 1/16" piece of strapping material to be slid underneath the package during vibration.

###### Results:

After the tests, none of the wirebound boxes experienced any structural damage; there was no spillage of contents; the passing criteria was met.

##### b. Drop Test (178.603)

###### Procedure:

Five new packages (No. 4, 5, 6, 7, and 8) were used for the five orientation drop tests: flat on the bottom, flat on the top, flat on the long side, flat on the short side, and on the corner. The height for all five drops was 4.0 ft (1.22 m). Each container was only dropped once in accordance with the requirements of CFR 49.

###### Results:

There was no visible damage on the containers (No. 4, 5, 6, and 7) after the first four drops (flat on the bottom, flat on the top, flat on the long side, and flat on the short side). On the fifth drop (on the corner), the container (No. 8) received minor indentation at the impact corner. However, the container was in a sound condition. All contents remained inside the container and the package was capable of being handled without danger of spillage. It was determined that the container met the passing criteria of CFR 49.

c. Stacking Test (178.606)

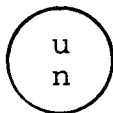
Procedure:

A new wirebound box (No. 9) was used for the stacking test. A dead load of 1,276 lbs was applied to the top of the container for a 24 hour period. This simulated a stack height of 10 ft (23 layers) of identical packages.

Results:

During the test, the container supported the load adequately. After the test, the container received a uniform compression of 1/16 of an inch. No structural damage was found on the container. The passing criteria was met.

5. Based on the above POP testing, the following POP symbol has been applied to wood wirebound containers in accordance with drawing 12630601.



4C1/Y26/S/\*\*  
USA/DOD/AYD

Insert the last two digits  
of year packed.